

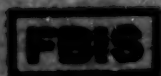
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3 December 1979

Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

No. 20



FOREIGN BROADCAST INFORMATION SERVICE

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WORLDWIDE AFFAIRS

NUCLEAR SAFEGUARD PROPOSALS PRESENTED TO UN

BK301125 Karachi Overseas Service in Urdu 0800 GMT 30 Oct 79 BK

[Text] Last night Pakistan presented draft proposals to the United Nations General Assembly's First Committee regarding safeguards for non-nuclear countries and setting up a nuclear-free zone in South Asia. In connection with the proposal on safeguards for non-nuclear powers, the United Nations was urged to recommend that the Disarmament Committee convene an international convention to provide the nonnuclear powers with safeguards from nuclear weapons or the threat of nuclear weapons.

Speaking on the proposal, the secretary of the Ministry of Foreign Affairs, Mr Shahnawaz, reiterated that Pakistan's nuclear program was for peaceful purposes. He said the hue and cry against Pakistan's just right to acquire nuclear technology for peaceful purposes might be aimed at diverting people's attention from the real danger of nuclear proliferation.

He also referred to the regrettable incident of the nuclear explosion by South Africa.

CSO: 5100

WORLDWIDE AFFAIRS

JAPANESE AGENCY TO ADOPT U.S. NUCLEAR RECOMMENDATIONS

OW310847 Tokyo KYODO in English 0733 GMT 31 Oct 79 OW

[Text] Tokyo Oct 31 KYODO--The Agency of Natural Resources and Energy said Wednesday that it will adopt any advice in the U.S. presidential commission's recommendation for stricter operation of the Nuclear Regulatory Commission (NRC) and nuclear plants. The agency said that the recommendation could be reflected in its policy after consultation with Japan's Atomic Energy Safety Commission. It said that since the Three Mile Island nuclear power plant accident in the U.S., the agency had carried out various measures, including recheckup of control systems at nuclear power plants. Many of measures mentioned in the U.S. recommendation have been implemented already, it added.

CSO: 5100

WORLDWIDE AFFAIRS

S. KOREA PLANS 17 NUCLEAR POWER PLANTS BY 1990

SK230102 Seoul HAPTONG in English 0054 GMT 23 Oct 79 SK

[Text] Seoul, Oct. 23 (HAPTONG)--South Korea plans to build 17 nuclear power plants by 1990 in an attempt to lessen its dependence on oil for energy. The plan was disclosed by Deputy Premier-Economic Planning Minister Sin Hyon-hwack when he met with visiting German Minister of Economics Otto Graf Lambsdorff Monday to discuss ways of expanding trade and economic cooperation between the two countries.

The West German minister asked the Korean side to give favorable consideration to West German firms' bid to participate in Korea's nuclear power projects, sources at the Economic Planning Board (EPB) said.

Explaining that all nuclear power projects in Korea will be carried out through international biddings, Minister Sin suggested that West German firms take part in international biddings to be held by South Korea for the construction of nuclear power plants, the sources said.

The German minister also called on the Korean side to extend due consideration to Siemens of West Germany which is trying to participate in Korea's planned installation of the electronic switching system (ESS) worth 300 million dollars, the sources disclosed.

In response to the German request, Minister Sin said that government offices concerned are reviewing the ESS project, adding that a final decision will be made later on the selection of foreign suppliers for the project. Minister Sin further disclosed that the Seoul government is considering joining the multi-lateral trade negotiations (MTN) on a selective basis, it was reported.

CSO: 5100

WORLDWIDE AFFAIRS

ITAMARATY DENIES PARTIAL CANCELLATION OF FRG NUCLEAR ACCORD

FY262223 Sao Paulo Radio Bandeirantes Network in Portuguese 0230 GMT
26 Oct 79 FY

[Text] Itamaraty spokesman Bernardo Pericás today publicly denied reports that the Brazilian Government intends to cancel parts of the Brazilian-FRG nuclear agreement. Quoting a recent statement by Foreign Minister Sarney Guerraire to congressmen, Pericás said "the agreement has been signed and executed."

This idea is not shared, however, by Joaquin de Carvalho, former president of NUCLENHAS Isotope Enrichment Inc. Testifying before the congressional committee charged with investigating irregularities in the Brazilian nuclear plan, Carvalho said that there are four weak aspects in the agreements: the economic, psychological, political and military sectors. Therefore, he said, the agreement is fragile and a threat to domestic security itself.

Carvalho also discussed the problem of trainees sent to Germany. In his opinion, they are extremely young, and despite their dedicated efforts, they lack the experience to recognize and learn truly essential technology. He regarded this type of training as overly expensive. Each student costs the Brazilian Government nearly 700,000 cruzeiros annually in addition to more than 65,000 DM tuition paid by the German Government to Kraftwerk Union.

CSO: 5100

WORLDWIDE AFFAIRS

NUCLEAR OFFICIAL REVEALED AS FORMER NAZI, SS MEMBER

PY291410 Sao Paulo Radio Bandeirantes Network in Portuguese 1000 GMT
29 Oct 79 PY

[Text] Alfred Boettcher, former member of the Nazi Party and the notorious SS during World War II, is the person responsible for the selection of technical personnel in Brazil within the nuclear agreement signed with the FRG. This has been revealed by the Sao Paulo Peace and Justice Commission and by nuclear physicist Mario Schenberg in an interview with a Sao Paulo newspaper. Schenberg has a recording of a telephone conversation in which a voice with a strong German accent threatens the nuclear physicist against revealing the name of Alfred Boettcher. In addition to Brazil, the former SS member has also carried out activities in South Africa, with which the FRG has also signed a nuclear agreement.

CSO: 5100

CANADIAN IN AUSTRALIA TO DISCUSS URANIUM MARKET

Sydney THE SYDNEY MORNING HERALD in English 3 Oct 79 p 10

[Text]

CANBERRA. — Techniques for the disposal of nuclear waste from reactors are still not perfect, the Premier of Saskatchewan, Mr Allan Blakeney, said yesterday.

But he said present, "acceptable-for-the-time-being" methods created no more hazard to the environment than conventional sources of energy, such as coal.

Saskatchewan has about 50 per cent of Canada's known reserves of uranium. Canada and Australia between them possess

about 50 per cent of the Western world's known reserves.

Mr Blakeney is in Australia to discuss the uranium market outlook.

He said he was confident further research would clear up the remaining problems.

The problem of safe storage and protection of plutonium after reprocessing could be solved by reprocessing in fast reactors, as opposed to breeder reactors.

This process burns up plutonium, leaving only a small but highly radioactive amount of nuclear waste.

BRIEFS

SAFETY OF NUCLEAR POWER PLANTS--Soviet specialists say problems of environmental protection can be solved at any level of atomic power engineering. The view has been expressed at the current Soviet-British electric power conference in Moscow. Nuclear power plants with a capacity of up to 6,000 megawatts are being [word indistinct] off the drawing board in the Soviet Union. All such plants, among them those already in operation, are safe and reliable. Experts believe chances of an accident at plants of this kind are slim. In their opinion an accident can only happen once in 10,000 years. Precautions are envisaged for hurricanes and earthquakes. The air at atomic power stations is cleaner than [word indistinct] thermal power stations. [Text] [LD301856 Moscow World Service in English 1600 GMT 30 Oct 79 LD]

CONFERENCE ON PROTECTING NUCLEAR MATERIALS--Vienna, October 29, TASS--The conference which elaborated an international convention on physical protection of nuclear materials has ended here. The conference was attended by representatives of 58 countries as well as of a number of international organizations. The convention will be opened for signing on March 3, 1980, at Vienna and New York simultaneously. As is pointed out in the International Atomic Energy Agency (IAEA), the document elaborated will contribute to consolidating the regime of nonproliferation of nuclear weapons, constituting an important step in the international cooperation in the peaceful uses of nuclear energy. [Text] [LD292344 Moscow TASS in English 1940 GMT 29 Oct 79 LD]

AUSTRALIA EEC NUCLEAR AGREEMENT--Australian negotiators are having talks in Brussels on proposal for the creation of a nuclear safeguards agreement with the European Economic Community. The Australian Government has said it will not sell uranium unless a potential customer agrees to certain conditions regarding the use of the nuclear fuel. Potential customers have been told that Australia wants to retain some control over what happens to the nuclear fuel it sells. Radio Australia's Brussels correspondent Malcolm Downing says the aim is to prevent the proliferation of nuclear material and in particular to have some check on the enrichment of uranium and the reprocessing of nuclear fuel. [Text] [Melbourne Overseas Service in English 1230 GMT 30 Oct 79 OW]

INTER-ASIAN AFFAIRS

BRIEFS

AUSTRALIA-JAPAN NUCLEAR COOPERATION--Japan's vice minister for international trade and industry, Mr Amaya, says his country would like to strengthen its relations with Australia concerning uranium. Speaking to a press club luncheon in Canberra today Mr Amaya said Japan did not want to limit its development to just the buying and selling of uranium. He said the Japanese also wanted to explore the possibility of participating in the development of an enrichment plant in Australia. Both countries are now engaged in a feasibility study on such a project. Mr Amaya said Australia stood out as an extremely important supplier of coal, natural gas and uranium. [Text] [Melbourne Overseas Service in English 1230 GMT 30 Oct 79 OW]

CSO: 5100

WAY CLEARED FOR DEVELOPMENT OF ROXBY DOWNS URANIUM

Melbourne THE AGE in English 10 Oct 79 p 1

[Text]

The Federal Government has approved the purchase by the giant BP oil company of a 49 per cent interest in the Olympic Dam copper, uranium and gold project near Roxby Downs, South Australia.

The approval has cleared the way for Western Mining Corporation, which discovered the enormous lode, to proceed with detailed exploration and development of the deposit.

The acting Treasurer, Mr. Robinson, announcing the approval, said the Foreign Investment Review Board's decision took into account that Olympic Dam was not solely a uranium project.

But the decision has confirmed the watering-down of the Government's uranium mining guidelines, which originally restricted foreign interests to 25 per cent of any uranium mine.

Western Mining sold the 49 per cent interest to BP for a minimum of \$35 million.

The British Government-controlled oil company will also have to organise all

By IAN PORTER

the funds necessary to fund the \$1000 million project.

It was another Western Mining project, at Yeelirrie, Western Australia, that forced the recasting of the Government's guidelines.

Although Western Mining holds a 75 per cent stake in Yeelirrie, it has pre-sold part of the production to Exxon, the biggest oil company in the world, in return for Exxon putting up 35 per cent of the mine development costs.

This was deemed to be an "equity-like deal" and prompted the Government to publish a list of criteria under which it would waive the 75 per cent local equity rule. Projects receiving exemption must still have 51 per cent local equity.

Olympic Dam appears to fit under the waiver that Australian sources could not meet 75 per cent of the development cost.

Western Mining and BP will have to go back to the Government later for a uranium export licence for Olympic Dam uranium.

AUSTRALIA

BRIEFS

NEW URANIUM FIND--A small privately owned Melbourne company has found uranium mineralisation about 80km from WMC's Roxby Downs prospect in the far north of South Australia. The company, Seaham Explorations Pty Ltd, yesterday reported the discovery of widespread uranium mineralisation on the north-eastern corner of Lake Torrens. The company's consulting geologists have told directors that considerable potential exists for the discovery of a significant uranium deposit. Seaham's managing director, Mr F. Douglas, said last night that he had already been approached by a major overseas-owned company regarding possible participation in the prospect. [Text] [Perth THE WEST AUSTRALIAN in English 10 Oct 79 p 61]

CSO: 5100

INDIA

DEFENSE MINISTER SPEAKS ON NUCLEAR ARMS ISSUES

BK291626 Delhi Domestic Service in English 1530 GMT 29 Oct 79 BK

[Text] The defense minister, Mr Subramaniam, has said that if Pakistan were to develop a nuclear arsenal, then India would be faced with a grave problem.

Speaking on India's defense strategy in the next decade at the National Defense College in New Delhi today, he said the country will face certain difficult decisions in this area of developing nuclear weapons in the coming decade.

Mr Subramaniam recalled the independence day speech of the prime minister and said Mr Charan Singh was exactly referring to this when he said that India would have to reconsider its policy if Pakistan goes nuclear.

The defense minister said he is not in a position to predict what the decision would be, but certainly he would not be naive enough to declare on behalf of all future generations that India will not make nuclear weapons. Mr Subramaniam listed a number of factors which would have a bearing on India's decision on going nuclear. They included whether Pakistan goes nuclear, whether the two superpowers continue with proliferation of nuclear weapons and whether the other three nuclear powers continue with their own programs.

Mr Subramaniam stressed the need to plan the overall industrialization of the country, taking into account the defense technological requirements. He said a changeover of weapons from one generation to another is to take place as a periodic phenomenon in the 80's. The stress will be on keeping imports to the bare minimum. He made it clear that India's intention is not to initiate any arms race.

CSO: 5100

LIBYA SEEKS TO EXCHANGE OIL FOR NUCLEAR EXPERTISE

Kuala Lumpur BUSINESS TIMES in English 26 Sep 79 p 6

[Article by Arun Bhattacharjee in New Delhi]

[Text]

OIL-SHORT India is facing the threat that its oil supply from Libya might cut by Col. Muammar Gaddafi in his compulsive quest for nuclear know-how.

Government sources said the Libyan ruler is putting pressure on India to share with Libya its expertise to make nuclear weapons in exchange for oil.

Libya has stood by India in the dark days of oil shortages brought about by the upheaval in Iran and the subsequent production cutbacks ordered by the post-Shah administrators.

There seems to be no question that India will resist the Libyan pressure, but that clearly won't solve New Delhi's painful dilemma.

India had hoped to obtain one million tons of Libyan crude this year and another 1.5 million tons in 1980. Thus far, only 300,000 tons of this year's contracted shipment has arrived. The remainder of this year's Libyan oil supply and that of next year may not arrive at all unless the two countries find a mutually accepted

solution to the nuclear issue.

For India, the Libya pressure underlines New Delhi's mounting oil problems. Before it was plunged into chaos, Iran was India's principal oil supplier. With the political turmoil in Iran, Iraq came to India's rescue by providing New Delhi with 8.5 million tons to eight millions of oil this year.

But Iraq has already notified India in advance that it cannot deliver the additional 2.5 million tons of crude oil starting next year. This will leave an unacceptable shortfall in the country's oil supply.

The Soviet Union looms as another oil source for India, but the Soviets prefer to supply refined products such as kerosene, diesel and other petroleum products which inevitably cost more.

The Libyans reportedly started putting pressure on India after New Delhi sold a shipment of its Libyan-imported crude to a French firm. Libya apparently resented the sale, but an Indian official explained that the contract with

Libya permitted India to re-export the Libya crude, denying any contract violation.

Oil Ministry officials feel that the Libya pressure was actually an attempt to undermine the two countries' oil agreement to enable the Libyans to divert contracted oil to the spot market where crude fetches from US\$35 to US\$40 (about \$33.6 to \$35) per barrel compared to the fixed of US\$16 per barrel.

But blackmail or not, Libya has told India that its oil supply arrangements will henceforth be dictated by political and not commercial considerations.

Indian sources said that aside from funding Pakistan's nuclear armaments programme, Libya is deeply committed to the acquisition of atomic technical know-how. Last year, when India and Libya signed a contract for cooperation in the field of nuclear technology for peaceful purposes, New Delhi pointed out that the agreement would not go beyond exchanges in nuclear know-how for purely peaceful uses.

India got the first clear hint of Libya's intention when Prime Minister Abdus Salaam Jalloud visited New Delhi. He was accompanied by the head of the Libyan Atomic Energy Department, H.N. Setha, chairman of the Indian Atomic Energy Commission, took pains to inform the Libyan visitors that it took India almost 30 years to reach its present stage of nuclear sophistication with a complement of more than 2,000 atomic scientists, backed up by a big pool of engineers and other technical men. He noted that Libya had fewer than half a dozen scientists.

Despite India's indifference, Libyan pressure persisted. The first real hint of Libya's intention to obtain nuclear know-how from India were disclosed at ministerial meetings. Later, requests for Indian assistance came through diplomatic channels. The Indian Foreign Ministry was forced to call the Libyan ambassador to explain to him the impossibility of Tripoli's request. Likewise, the Indian ambassador to Libya personally explained the in-

dian position to Colonel Gaddafi, but the Libyans would not listen.

India has bilateral agreements on nuclear cooperation with about 12 developing countries including Vietnam. But these agreements are all governed by the internationally-sanctioned exchange of data and training facilities and are closely supervised by the Indian Atomic Energy Administration.

Indian-Libyan relations have grown closer despite minor irritants. During the Indo-Pakistan war in 1965, Libya supplied Pakistan with small arms, but refused Pakistan's request for fighter planes and bombers. Iran also sent small arms to Pakistan, but like Libya, it refused to provide Islamabad with major offensive weapons.

Indian firms too have been getting large contracts in Libya. Tripoli's major power station is being built by the Bharat Heavy Electrical Limited (BHEL). Another smaller power station in Libya is also being constructed by an Indian firm.

Indian companies are also engaged in the construction of an airport terminal in Libya, roads, housing complexes and other facilities. The total Indian contract is estimated at present to be worth US\$1 billion. The total tab is expected to double in a year or two.

India's dilemma deepens with the mounting Libyan pressure. New Delhi is painfully aware that the cutback in Libyan oil supply would greatly jeopardize the Indian economy. Its refinery at Madras, which used to obtain crude from Iran, is in the doldrums. Unless Libya agrees to supply crude, the Madras refinery will have to be shut down.

The caretaker government of Prime Minister Charan Singh has expressed the hope that Libya will relent. At the same time, however, the government has started drawing a blueprint designed to cushion the harsh impact of a sharp Libyan oil supply cutback. Colonel Gaddafi's reputation as a mercurial leader does not give India much encouragement. — Dep-thnews

PAKISTAN

ATOMIC ENERGY OFFICIAL URGES INTERNATIONAL COOPERATION

BK021040 Karachi Domestic Service in English 1005 GMT 2 Nov 79 BK

[Text] The chairman of the Pakistan Atomic Energy Commission, Mr Munir Ahmed, has said the time has come for opening a meaningful dialog between the Muslim countries on the one hand, and the advanced states on the other to evolve an agreed formula of cooperation to harness nuclear energy for peaceful purposes. In an article, he said this cooperation is essential in order to acquire necessary technology related to energy. Muslim countries should work in harmony with other countries to accelerate this process.

He said serious consideration should be given to the setting up of a special fund backed by oil exporting countries to finance projects aimed at overcoming the energy problem. He said the Muslim countries need to secure their future and protect themselves against the adverse effects of their decreasing oil resources. They should persuade the industrialized countries to be as generous with them in the transfer of technology as they have been in supplying oil to them.

CSO: 5100

PAKISTAN

BRIEFS

RIGHT TO DETONATE NUCLEAR BOMB--Islamabad, October 28, TASS--Pakistan's President General Ziaul Haq said at a press conference that he reserves the right to adopt a decision on exploding a nuclear device if this is required by the interests of the development of Pakistan's atomic power energetics. [Text] [LD281542 Moscow TASS in English 1457 GMT 28 Oct 79 LD]

CSO: 5100

INVESTIGATION INTO SAFETY OF PLANNED NUCLEAR REACTOR

Kuala Lumpur BUSINESS TIMES in English 4 Sep 79 p 17

[Article by Paul Icamina in Manila]

[Text]

ANTI-NUCLEAR activists were surprised here when President Marcos suddenly ordered the suspension of construction at the US\$1.3 billion (about M\$2.64 billion) Philippines nuclear plant.

At the same time, Mr Marcos created an investigative committee to look into the safety questions posed by the nuclear plant expected to be operational by 1982, at the latest by 1984.

The next day, Mr Marcos also directed the Justice Minister and the Solicitor General to look into the possibility of cancelling the government's contract with Westinghouse Power Systems Company, the nuclear plant's main contractor, because of a violation of what he called "implied warranty of safety."

The President's actions surprised most Filipinos, especially anti-nuclear groups who have been lobbying for years against the construction of the nuclear plant because of safety reasons.

Residents of Morong (the plant site 80 miles from Manila) cabled the President thanking him for the decision. Barrio folks of Nagbalayong (the nearest village four kilometres from the site) wrote Mr Marcos a letter

imploping that the nuclear reactor be totally scrapped.

"I was surprised with the speed with which he acted upon my request," former Senator Lorenzo Tanada told *Deputacion*. Mr Tanada, a vocal oppositionist to the martial law regime, wrote a letter to the President last June 24 requesting for an investigation of the nuclear plant's safety.

Mr Tanada was later appointed by Mr Marcos as co-chairman of the investigative committee together with Assemblyman Ricardo Puno. Mr Tanada later refused the chairmanship after consultation with the opposition party Laban (Fight) which, after unanimously voting against the appointment, left the decision with the former senator.

Mr Tanada told President Marcos that he (Tanada) does not possess "impartiality," saying that "since last year, I have already prejudged the matter." In the Laban campaign last year, Mr Tanada questioned not only the safety aspects of the nuclear plant but also the contractual and financial arrangements in its acquisition and construction.

The nuclear plant,

which is expected to generate 120 megawatts when finished, has long been the object of public criticism and even investigations from the government itself. Early last year, President Marcos was considering cancellation of the Westinghouse contract because of payments allegedly made by the American corporation to a relative of Mr Marcos.

Mr Herminto Disini, a husband of a first cousin of Mr Marcos' wife, is the prime local subcontractor for the nuclear plant that is 60 per cent financed by the United States through the Export-Import Bank, according to documents with the US Nuclear Regulatory Commission (NRC). According to the documents, Mr Disini and other Filipino interests will earn about US\$800,000 from the project while Westinghouse will receive US\$330,000 for the system, turbine generator, and auxiliary equipment.

Early last year, the US-based Union of Concerned Scientists charged that the plant being built by Westinghouse was poorly designed with as many as 360 major unresolved problems. It said the Westinghouse claim on safety is "unsubstantiated," and that the safeguards were technically naive and inadequate.

But it was events early this year that, observers believe, paved the way for President Marcos' actions. Last January, US President Carter required Federal agencies to first analyse the environmental consequences of their projects abroad.

The order requires, for example, the Export-Import Bank to write environmental

assessments on export loans for American-made nuclear reactors.

A Westinghouse application before the NRC to export a reactor to the Philippines will also likely be the first nuclear export application to fall under the environmental review requirements.

Already, last April, an intervention with the NRC and a public hearing on the Westinghouse application have been requested by two groups, the Centre for Development Policy of the US and the Philippine Movement for Environmental Protection, an organisation of Filipinos residing within 60 miles of the reactor site. The groups are asking the NRC not to grant the Westinghouse application.

The initial application for a licence to export the reactor was filed by Westinghouse in 1976. Last August 1978, it also requested a licence to export reactor components, and in March this year, applied for a licence to export fuel for the reactor.

In order to meet its contract commitments, Westinghouse should have begun shipments of initial components last year. Late March this year, construction at the Bataan site was halted. (Westinghouse insists that it is not liable for export tie-ups when the US government is the cause of the delays.)

Most observers here also believe the weekend orders were the reactions of President Marcos to the Three Mile Island incident and the possibility of a core meltdown.

Mr Marcos said that after the Three Mile Island incident, he asked the Ministry of Energy to require Westinghouse to

send experts here to discuss the safety features of the Bataan reactor. The Westinghouse experts have not shown up yet.

The eight questions which Mr Marcos posed to the investigative committee have always provided anti-nuclear activists with their strongest arguments against the nuclear plant.

Among other questions, President Marcos wanted to know what specific safeguards have been taken against repetition of the Three Mile Island incident in Bataan, if the operators of the plant are qualified to handle accidents, and who will pay for the damages and cost.

He also wanted to know if the Bataan nuclear plant is located in an earthquake fault or if it will be able to withstand a similar earthquake which shook Mindanaho two years ago (intensity 7.3 on the Richter scale).

The President also asked where, how and by whom will nuclear waste be disposed and what are the risks involved.

Anti-nuclear groups have always maintained that the nuclear plant site is unsafe, citing a NRC site investigation report which said that "volcanic hazards have not been thoroughly checked (and) though Mt. Natib (14 kilometres from the site) has no record of historic activity, it is likely that (it) be considered active."

A geological fault has also been detected near the plant site, raising questions that it is vulnerable to devastating earthquakes.

The Philippines has also no permanent storage site for nuclear waste since there is no known stable salt rock formation in any of the islands. — *Deputations*

INTERNATIONAL AFFAIRS

STROUGAL RECEIVES USSR MINISTER OF POWER ENGINEERING

Cooperation Discussed

LD261950 Prague Domestic Service in Czech 1130 GMT 26 Oct 79 LD

[Excerpts] In Prague's Hrzan Palace today, Federal Premier Lubomir Strougal received Viktor Korotov, Soviet minister of power machine building, who is in Czechoslovakia on a visit. They assessed as positive the development of cooperation to date between Czechoslovakia and the USSR in manufacturing equipment for nuclear power stations. Comrade Lubomir Strougal voiced high appreciation in particular of Soviet experience and assistance in the introduction of exacting production methods in our republic.

Conclusion of Visit

LD272232 Prague CTK in English 1706 GMT 27 Oct 79 LD

[Excerpts] Prague--Soviet Minister of Power Engineering Viktor Korotov left here Saturday for home. At the end of his stay in Czechoslovakia he and Czechoslovak First Deputy Minister of Metallurgy and Heavy Engineering Tibor Kurtha signed a protocol on further cooperation in the production of nuclear power plants equipment.

CSO: 5100

INTERNATIONAL AFFAIRS

BRIEFS

SZYDLAK ADDRESSES SEJM SESSION--In our efforts to develop our energy base we are seeking to further tighten cooperation with our CEMA partners, particularly with the Soviet Union. In cooperation with the Soviet Union we will develop the power stations that will use new sources of energy, in particular nuclear energy. The process has been initiated by Poland's participation in the construction of a nuclear power station in the USSR, which will produce 1,000 megawatts of energy for our country. In Poland we are developing schemes for the production of installations for nuclear energy under the system of individual tasks allotted to CEMA countries. [Excerpt] [AU301940 Warsaw TRYBUNA LUDU in Polish 26 Oct 79 pp 3, 4 AU]

CEMA NUCLEAR POWER SESSION--Plovdiv, October 5 (BTA)--The five-day session of the second section of the CEMA Permanent Commission on the Peaceful Use of Atomic Energy ended here today with the signing of a protocol for the coordination of scientific research and transfer work. During the discussions measures were coordinated for the expansion of the cooperation of the CEMA member-countries in instrument making, radiation and radiation-protection equipment and also in the use of nuclear energy in science, engineering and other fields. [Text] [Sofia BTA in English 1845 GMT 5 Oct 79 AU]

C50: 5100

CZECHOSLOVAKIA

PRODUCTION OF NUCLEAR REACTORS REPORTED

AU301543 [Editorial Report AU] Prague MLADA FRONTA in Czech on 27 October on pages 1 and 2 carries an article by Jan Cech entitled "There Are 15 Producers of Nuclear Reactors in the World; Solo for Skoda's Atoms."

Cech opens his article by stating that "today any power engineer will confirm that for at least the next 50 years we must rely mainly on nuclear energy." Cech goes on to state that the CSSR, apart from the USSR, is the only CEMA country manufacturing nuclear reactors for the entire socialist community. The Skoda enterprise of Plzen and the VZKG enterprise of Ostrava are two of the world's 15 firms devoting themselves to the manufacture of reactors. The VVER-440 reactor manufactured in the CSSR consists of 39 sections [uzly] of which 29 are being manufactured by Skoda and the remainder by VZKG.

Cech quotes Zdenek Strnad, assistant director general of the Skoda Plzen economic-production unit, as stating in an interview that the pressure vessel [tlakova nadoba] of the reactor now under construction must be ready and tested by the middle of February 1980 and then sent to the Paks nuclear power plant in Hungary. By September 1980, the sending of the rest of the reactor to Paks will be expedited so that Soviet experts can start assembling it and have it ready for a test run by the end of 1980, Strnad stated.

In another part of the interview, Strnad stated that there are nine other pressure vessels under construction in the Skoda enterprise, of which one more is for the Paks nuclear power plant, two for Czechoslovakia's nuclear power plant in Jaslovské Bohunice, and one for the Nord power plant in the GDR--"in short: Our task is to manufacture by 1985 a total of 19 nuclear reactors of the VVER-440 type, of which 9 will be for the CEMA countries," Strnad stated. Adding that in 1983 his enterprise will begin manufacturing the VVER-1000 reactors, with considerably higher performance. The first one of these will be delivered to the Malovice power plant near Ceske Budejovice in 1985, he stated.

CSO: 5100

ARGENTINE-BRAZILIAN NUCLEAR COOPERATION VIEWED WITH CONCERN

Montevideo EL PAIS in Spanish 31 Oct 79 p 9

[Text] It is very difficult to disregard a topic as important to human destiny as that of nuclear fission. It is even more difficult to avoid discussing it when mention is made of its use in the construction of devices with military applications and when they involve our closest neighbors. It was precisely two reports which brought up this crucial issue, and both are related to the southern hemisphere.

The first report was disclosed when a North American meteorological satellite detected a bright, short-lived flash of light near the South African coast. The hypotheses began to gather concerning this incident.

Some time ago, there was a reference to the possibility that South Africa might be scientifically, technically and economically equipped to build its own atomic bombs. Therefore, the first speculation (which is still under way) was aimed at maintaining that this country, which has not signed any agreement to limit nuclear proliferation, had detonated a weapon of that type.

The rumor was promptly belied by the South African Navy.

Replacing it were two potential accounts associated with the Soviets. The one most widely disseminated relates the flash of light reported by the North Americans to an accidental explosion which took place in a Russian nuclear submarine; an assumption which Washington rejects, since it is of the opinion that those vessels do not operate in the waters wherein the flash of light occurred, and also for technical reasons.

The other account, a more recent one, is based on the hypothesis of a South African scientist: The phenomenon may have been due to the explosion of a Soviet test missile submerged in that area and unsuccessfully sought for the past 16 years.

Whatever the explanation may be, the point that is really cause for concern is the possibility that South Africa may have joined the select atomic club,

a club which is, moreover, comprised of powers to which no one has lent backing for their manufacture of these dreadful weapons, but which, once that privilege was attained, have been opposed to others following in their own footsteps.

Reasoning with a realistic approach, it may be assumed that any country whose existence is seriously threatened, or with neighbors which have or which are capable of having such devices, will not gage the scope of its sacrifice (India is a good example) to achieve that status. The list may be completed with Israel and Egypt, Taiwan and South Korea, Indonesia and Pakistan; and, in view of its international isolation and its great scientific capacity, South Africa. Also (and we need not harbor many illusions about it), it may include some Arab nation which would exchange barrels of oil for atomic technology.

Excluded are the large industrial nations which are in a position to produce their own nuclear weapons but which, for understandable reasons, have refrained from doing so.

Deliberately left out is the Latin American continent, where, as we know, both Mexico as well as Argentina and Brazil are not very far removed from making the dream (or nightmare) of their own atomic bomb come true.

The second report that we cited makes precise mention of an alleged agreement between Brazil and Argentina to manufacture nuclear explosives. To be sure, nothing has been confirmed, either the report itself or the alleged visit by President Figueiredo to Buenos Aires in March 1980, the occasion on which the announcement would reportedly be made.

But all of this is so absurd that it is difficult to believe. Brazil has a splendid future ahead of it, as it develops, takes advantage of the potential dormant in its vast territory and eliminates the tragedy of hunger and illiteracy which besets and immobilizes a third of its population.

Argentina, for its part, the possessor of an enviable technological capacity and homogenous development, but crushed by uncurbed inflation, cannot and should not devote its energy to the belligerent venture of nuclear fission, but rather to the peaceful use of this fabulous source of energy. Its dispute with Chile has no reason to be exaggerated to the point where that type of weapon would be warranted; nor can its aspiration (a logical one if not excessive) to be and act as a great power be based on these extremely expensive devices, particularly if Brazil eventually possesses them as well.

What might now be interpreted as a friendly collaboration and an unequivocal degree of improvement in the relations between the two largest South American countries may tomorrow mark the inevitable beginning of a high-level arms race, which neither of the two could continue except to the detriment of the legitimate needs of their respective peoples.

Let us hope that the natural good sense of the governments of our neighboring countries will definitively preclude the possibility of an agreement between them for the purpose alleged by a Sao Paulo newspaper.

So let us trust that the report which has upset America is completely groundless.

2909

CSO: 5100

INTER-AMERICAN AFFAIRS

BRAZIL-ARGENTINA NUCLEAR AGREEMENT MAY PERMIT 'JOINT A-BOMB'

Figueiredo Visits Argentina

PY300205 Asuncion ABC Color in Spanish 29 Oct 79 p 2 PY

[Excerpts] Sao Paulo, Brazil, 28 Oct (AFP)--A nuclear agreement which will permit Brazil and Argentina to jointly make nuclear bombs will be the main result of the visit Brazilian President Joao Figueiredo will make to Buenos Aires in March, FOLHA DE SAO PAULO reported here today.

The information was released today in a front-page report entitled "Brazil Thinking of the Atomic Bomb With Argentina." It states that "this is one of the possible clauses of a future nuclear agreement" with Argentina which President Figueiredo "will sign in Buenos Aires in March."

It adds that the agreement could provide for the sale to Brazil of Argentine technology which would permit Brazil to make nuclear weapons; in return, Brazil would transfer uranium prospecting technology to Argentina. It quotes the Brazilian diplomatic sources who revealed this possibility as stating that "in the nuclear field, either there is confrontation, such as between the United States and the Soviet Union, or cooperation, as in the case of European countries."

It also states that if the Brazilian-Argentine nuclear agreement achieves these objectives, "Brazil and Argentina could jointly make an atomic bomb." It adds that if the two countries failed to reach an agreement to jointly make an atomic bomb, "they could at least sign an agreement to exchange information and hold consultations in the nuclear area as the basis for a future bilateral nuclear nonproliferation pact." The Brazilian newspaper states that the transfer of Argentine nuclear technology for the production of fuel elements will permit Brazil to make nuclear weapons "which it cannot do with the agreement signed with the FRG in June 1975."

According to FOLHA DE SAO PAULO, the Brazilian reactor factory could sell components to Argentina for Atucha 2, which will be built by the German enterprise KWU (Kraftwerk Union), which is responsible for selling equipment for the Brazilian Angra 1 and Angra 2 nuclear plants.

Bomb Collaboration Denied

PY300207 Buenos Aires LATIN in Spanish 2355 GMT 29 Oct 79 PY

[Text] Brasilia, 29 Oct (LATIN)--The Brazilian Government today regarded as baseless press reports indicating that Argentina and Brazil could make an atomic bomb.

Itamaraty spokesman Bernardo Pericas said today that there is no nuclear agreement between Argentina and Brazil. He added that Brazil had signed and ratified the Tlatelolco treaty which bans nuclear weapons in Latin America. He noted that although Brazil is not legally bound to the above treaty, since it has vowed not to ratify two annexes of the treaty until the nuclear powers ratify them, it is committed to not doing anything which would go against it.

In a front page report, FOLHA DE SAO PAULO said yesterday that Brazil and Argentina could jointly make the A-bomb. Pericas quoted recent remarks made by President Joao Figueiredo that although no field of cooperation with Argentina should be excluded, this does not mean that something exists on nuclear cooperation between the two countries. He added that Brazil is against the proliferation of nuclear weapons and that it favors the use of nuclear energy for peaceful purposes.

CSO: 5100

BRAZIL

CLAUSE ON SALE OF ENRICHMENT PROCESS SAID MISTRANSLATED

PY310107 Rio de Janeiro JORNAL DO BRASIL in Portuguese 27 Oct 79 p 17 PY

[Excerpt] FRG Prof Erwin Becker, who invented the jet-nozzle process for uranium enrichment, yesterday corrected a declaration he made last Tuesday before the Senate congressional investigating committee on the Brazilian-FRG nuclear agreement. Professor Becker blamed "translation problems" for the interpretation that the agreement obliges Brazil to export enrichment plants--a question which is considered "sensitive" because it makes possible the acquisition of material to produce atomic bombs.

According to Professor Becker, the intention to export the enrichment process can be noticed in the context of the agreement, "to make possible the most economic utilization of the process," but neither the FRG nor Brazil is obliged by the agreement to make such exports.

CSO: 5100

BRIEFS

NUCLEAR PLANT IN ESPIRITO SANTO--Inhabitants of Santa Cruz village, 60 km north of Vitoria (Espirito Santo State), say that a nuclear plant will be built on a 50 square km plateau adjacent to the Baiacu campground [Arraial]. Since 1977 NUCLEBRAS officials have been surveying the region, where two FRG experts have been seen in cars with Angra dos Reis license plates.

[Excerpt] [PY310050 Rio de Janeiro JORNAL DO BRASIL in Portuguese 28 Oct 79 p 1 PY] The president of the National Nuclear Energy Commission, Prof Hervaldo Guimaraes de Carvalho, affirmed yesterday that reports that for 2 years NUCLEBRAS has been secretly building a nuclear plant in Santa Cruz, Espirito Santo, are unfounded. Professor Carvalho stated: "Any nuclear question in this country has to be examined by the CNEN, and I do not recall any request for the installation of a nuclear plant in Santa Cruz."
[Excerpt] [PY310052 Rio de Janeiro O GLOBO in Portuguese 30 Oct 79 p 24 PY]

CSO: 5100

EGYPT

BRIEFS

STORING NUCLEAR WASTE OPPOSED--Cairo, 30 October--The opposition Socialist Labor Party today expressed its outspoken opposition to alleged European plans to store nuclear waste in Egypt's western desert. The party's weekly ASH-SHA'B says it is inadmissible to store European nuclear waste at a time when the Austrians, Americans and (?Swedes), for example, refuse to store such wastes in their countries. The weekly calls on the Egyptian Government to reject European nuclear waste and to reconsider the idea of building a nuclear plant in Egypt. [Excerpts] [NC301622 Cairo DPA in Arabic 1448 GMT 30 Oct 79 NC]

CSO: 5100

COMMENTARY, SPECULATIONS ON REASONS FOR U.S. REPORT ON A-TEST

'DIE BURGER' Editorial

Capetown DIE BURGER in Afrikaans 20 Oct 79 p 12

[Editorial: "The Propaganda Bomb Over Atomic Power"]

[Text] South Africa has good reasons to feel inflamed over the clumsy manner with which the United States has unleashed a propaganda bomb with respect to South Africa's alleged involvement in the explosion of an atomic bomb in the atmosphere. As could be expected this has had the result of dragging South Africa into a storm in the United Nations and elsewhere.

According to reports, during September an American satellite noted signs of a possible nuclear explosion somewhere in the southern hemisphere. Due to the fact that the United States itself could not determine what exactly had happened and whether this was of importance to it, the decision was made to keep silence on this event at first.

However, as is often the case in the United States, this news leaked out and so the United States was forced to reveal whatever information was available. Although it had no proof it proceeded to give the world vague accusations with respect to South Africa.

This had the desired effect of arousing suspicion against South Africa. It has actually been put on the defendant's bench and the UN General Assembly has even tasked Dr Kurt Waldheim to look into this matter and to report on it. For the umpteenth time an excuse was found for making South Africa the punching bag of the world. The United States should be reprimanded for acting in this manner. It could have told the United Nations that it is not an advocate for South Africa, but that it is premature to single out South Africa as the scapegoat from the start because of the fact that there is no proof for the accusation.

But the United States did no such thing. Thus it connived to have voices raised against South Africa again without the benefit of evidence, knowing

that this would result in extreme embarrassment for South Africa and its trading partners.

This is not the first time that the United States has taken such actions against South Africa. The crude efforts it has made in the past, aimed at determining what South Africa is doing in its area in the field of nuclear research, by means of espionage, is still fresh in our memory.

This most recent incident must be looked at against the background of the failures of President Carter's domestic and foreign policy. In an effort to save a little of his prestige (he is even being opposed within his own ranks as a candidate for the presidential elections) President Carter is anxious to have the talks on the Strategic Arms Limitation Treaty (SALT II) turn out to be a success.

America's inability to determine whether a nuclear blast has really taken place, despite its modern equipment, is indeed a blow to its claim that it leads the world in the area of nuclear science. Moreover, this will not help President Carter to obtain support from the Senate for his efforts in obtaining passage of SALT II.

This is now raising the question as to whether this is not the reason why the United States considered it advantageous to drag South Africa into the fray. In the past South Africa has always, all too easily, been used as a lightning rod.

It is regrettable that South Africa should be implicated in such a manner just at the time when it is constructively contributing to the peace negotiations over Zimbabwe-Rhodesia. And to think that this is being done by a country which does not hesitate to call for South African help whenever this suits its purposes.

This incident goes to show once more the morality of the leaders of the free world.

'DIE TRANSVALER' Editorial

Johannesburg DIE TRANSVALER in Afrikaans 29 Oct 79 p 8

[Editorial: "The Bomb Boomerang"]

[Text] The new effects of the storm unleashed by the United States over the alleged testing of an atomic bomb by South Africa are putting this leading country in an especially bad light. Only those who have their minds set about not hearing anything good about South Africa will be dragged along by the regrettable American maneuver.

Mr Pik Botha has already pointed out what a poor showing the United States has made as a leading country as a result of its nervous reaction to very

scanty information. Now there are also conjectures that this was an American trick aimed at obstructing South Africa's uranium enrichment process which can cause financial damage to the United States. Moreover, it is also being speculated that this is a political move aimed at creating suspicion about the SALT II agreement, the reason being that if the United States cannot monitor such tests by South Africa there can be no guarantee that the United States will be able to monitor Russian violations of the SALT agreement.

If America is playing such little games with as great a threat to world peace as nuclear bombs then its allies must persuade it to be more sensible and to do so immediately. It is most inconceivable to attempt to drive South Africa from the community of nations on the basis of its ability to test an atomic bomb.

Rather, in such circumstances it should be drawn closer to that community and its status and role in an orderly Southern Africa taken into account.

'DIE VADERLAND' Editorial

Johannesburg DIE VADERLAND in Afrikaans 27 Oct 79 p 6

[Editorial: "Do We Have the Bomb?"]

[Text] The accusation by the U.S. State Department that on 22 September of this year South Africa exploded a low yield nuclear bomb over the sea seems to be peculiar.

Why was there no official protest through diplomatic channels? And why was the information not publicized until now?

Also why was such a statement issued when there is admission in Washington that there is no substantiating proof to be found?

The statement also mentions the fact that information on the alleged explosion was brought immediately to President Jimmy Carter's attention. U.S. aircraft, ships and even spy satellites have teamed up in looking for proof of the explosion. Nothing has thus far been found.

In South Africa there are strong denials from official sources and even words like "rubbish" are being employed.

We want to believe that this is indeed the case and that South Africa has not violated the Nuclear Nonproliferation Treaty of March 1970, although it is, of course, not a signatory to it.

We have all reasons to believe that nuclear power in South Africa is being used only for peaceful purposes and that the republic is not going to enter a nuclear weapons armament race.

The arsenal of nuclear weapons amassed by the Soviet Union and the United States is already sufficient for destroying the entire planet. In addition the world has also had to learn that a politically unstable country such as Pakistan also has an atomic bomb, and so does India, its neighbor.

At one time there were also strong rumors that Iran was moving in this dangerous direction when the Shah was still in power.

Finally it is certainly justifiable to mention the fact that the so-called Nuclear Nonproliferation Treaty of 1970 is not worth the paper on which it is written if one looks at the bona fides of the countries which have signed it...the Soviet Union itself and its satellites: Bulgaria, Czechoslovakia, GDR, Poland and Romania.

'DIE VADERLAND' Comment

Johannesburg DIE VADERLAND in Afrikaans 30 Oct 79 p 16

[Editorial: "The 'Bomb' Strikes Back"]

[Text] The Americans' accusations about a so-called South African nuclear explosion can ultimately strike back at them.

Since the original accusations by the Americans, contradictory statements from their country indicate that the Americans are very unsure about this matter.

All this comes at a time when it is basically essential with respect to the SALT II agreement that the United States know exactly where, when and of what magnitude a nuclear explosion is...and if there was one. Now this has turned out to be a kind of groping around which indicates that the Americans (and the West) have reasons to worry about this clumsiness. In Moscow people very certainly must be laughing.

The thing which is surprising is that the Americans failed to first make absolutely sure that they had factual information before coming out with accusations.

Or is this an indication that the desire to hurt South Africa, in any possible and impossible manner, is so great that all other considerations become eclipsed?

After all this it will not be surprising if the American people will be somewhat skeptical about Washington's part in any further agreement with the Russians about limiting the armament race between the two countries.

The Carter government's foreign policy is already under suspicion. Authoritative American comments have even branded it as a fiasco.

In the meantime South Africa should not be upset by all this furor. The application of nuclear power for peaceful purposes holds great possibilities and we must simply forge ahead on the road we have taken.

In the future accusations of this sort will probably kick up far less dust.

7864

CSO: 5100

INTERNATIONAL AFFAIRS

BREEDER REACTORS TO CONTRIBUTE TO INDEPENDENT EUROPEAN ENERGY SUPPLY

Zurich NEUE ZUERCHER ZEITUNG in German 20 Oct 79 p 25

[Text] The international conference on "nuclear power plants with breeder reactors in Europe" just ended on Wednesday in Lucerne. The conference, in which more than 160 representatives from 19 nations participated, was sponsored by the Swiss Union for Atomic Energy (SVA) in collaboration with the Forum Atomique European (Foratom). The most prominent participant was Prof A. M. Petrossjanz, chairman of the National Committee for the Use of Atomic Energy in the USSR.

The conference was convinced that breeder technology is already sufficiently developed in order to make the commercial introduction of nuclear breeder reactor plants possible within the next few years. The conference assured further that breeder reactors could contribute to European independence in energy supply thanks to their good uranium efficiency.

Political decisions to be made shortly in Great Britain, France, Germany and other countries about the commercial introduction of breeder reactors are of the greatest significance for the future of atomic energy. It is therefore in Switzerland's interest to keep informed about international developments.

9328

CSO: 5100

INTERNATIONAL AFFAIRS

BRIEFS

COOPERATION ON NUCLEAR SAFETY—France and Switzerland want to cooperate on nuclear safety. An agreement to this effect was signed on Thursday in Paris in the name of both governments. There are plans--according to a communique of the Federal Department for Foreign Affairs--to establish a communications system. It is to make possible the immediate exchange of information concerning emergencies which might affect the neighboring country. Under certain conditions, a liaison man could be sent to the appropriate authority of the other country. [Text] [Zurich NEUE ZUERICHER ZEITUNG in German 20 Oct 79 p 25] 9328

CSO: 5100

REACTOR SAFETY SOCIETY STUDY ON RISKS OF NUCLEAR POWER

Frankfurt/Main FRANKFURTER RUNDSCHAU in German 17 Sep 79 p 14 and 12 Sep 79 p 10

[Excerpt from Reactor Safety Society's "German Risk Study": "Existing Safety Concept Has Proved Successful"]

[Text] The danger of a reactor accident involving loss of life is extremely small. This is the conclusion found in the "German Risk Study" presented recently in Bonn by FRG Research Minister Volker Hauff. In interpreting this initial scientific study on the dangers of nuclear technology in the Federal Republic, Hauff said he had not had to change his views on the peaceful use of nuclear energy. The minister warned against minimizing or dramatizing the risks of nuclear energy. Rather, what is needed is a discussion of advantages and risks based insofar as possible on events and facts. The study calculates the greatest harm from a nuclear power plant accident to be 104,000 fatalities from latent effects in the course of 30 years, with the incidence of such an accident estimated at once in 2 billion years of operation. The greatest "acute effect" immediately following the accident would cost 14,500 human lives.

The "German Risk Study" was prepared during the past 3 years by the Reactor Safety Society under the direction of Professor Adolf Birkhofer and is comparable to the report on the risks of American reactors produced by U.S. scientist Rasmussen. According to Rasmussen, the highest statistical probability of an accident involving a reactor core meltdown would be once in 17,000 years per power plant; the Birkhofer study gives a figure of 10,000 years.

The Birkhofer report notes that a direct transference of the Rasmussen study to German conditions was not permissible because the technology of U.S. nuclear power plant construction differs from that of German installations. In addition,

average population density in this country is 10 times greater than in the United States. Even in the immediate vicinity of reactors here, population density is 3 times greater than for areas surrounding U.S. reactors.

We present an excerpt from the German risk study in today's edition and in one of our next issues.

Introduction

Safety considerations have played an important role in nuclear technology from the very beginning. Thus, extensive safety requirements have been imposed on nuclear power plants from the planning stage through construction and on to operation. These requirements are a central element of the nuclear licensing procedure and are specified in the minister of interior's safety criteria for nuclear power plants, or the Reactor Safety Commission guidelines and nuclear regulatory mechanism.

On the basis of license applications, the responsible authorities determine whether the necessary scientific and technical precautions have been taken against harm resulting from the construction and operation of nuclear power plants. It must be noted in this regard that operational discharges of radioactive materials must be kept as low as possible, including those with critical values lower than prescribed levels. Accidental releases must be limited in such a way that according to human standards no damage can be expected to health or property in the surrounding area.

Essential to a study of the technical safety aspects of nuclear power plants is an analysis of possible accidents based on available technical knowledge. An individual analysis of each of these accidents is not considered necessary. Rather, the best approach consists in identifying hypothetical accidents, incidents which place the greatest strains on safety systems, and studying them as representative of other accidents. Proof that existing safety systems can control hypothetical accidents constitutes simultaneous proof that other accidents, not studied but covered by this method, can also be controlled.

The existing safety concept in nuclear technology has proven successful, as is shown by the safety balance sheet from nearly 1,500 reactor-operation years. No fatalities caused by releases of radioactivity have occurred in the vicinity of nuclear power plants, and there has been no evidence of other adverse effects on health. Nevertheless, accident-related effects can never be ruled out with absolute certainty. This residual risk can only be estimated using analytical methods.

Accidents have been studied from various aspects outside the legal nuclear licensing procedure, particularly accidents whose effects are indeed basically conceivable but so unlikely that the installations require no special technological measures. The best-known is an American and British study

dealing with the effects of arbitrarily assumed radioactivity releases, but no attempt was made here to establish a connection with an actual situation. The purpose of this study was not, however, to make a systematic determination of risk including probability of occurrence; it was designed to estimate maximum effects, clarify insurance-related questions, conduct parameter studies, derive safety requirements and the like.

The American "Reactor Safety Study," the "Rasmussen Report" (WASH-1400), was the first comprehensive study to determine the accident risks of nuclear power plants. The report was published in October 1975 after about 3 years of work. It was the first attempt to quantify the risks deriving from the operation of a large number of nuclear power plants in one country. The study permitted the classification of all accidents according to probability and effects within the spectrum of human experience.

Although the American "Reactor Safety Study" was published initially as a draft report inviting critical examination and comment, with the final version to contain those changes and additions considered necessary, in the succeeding years it has been studied and criticized a great deal. The present status of the work is best characterized by the results of the "Lewis Report," which makes the following comments in addition to criticism, particularly of the excessive burden placed on its validity:

- (1) WASH-1400 was a substantial improvement over earlier attempts to assess the risks of nuclear technology;
- (2) WASH-1400 was successful for the most part from three aspects: It achieved a far-reaching objectivity on reactor safety issues; it introduced a useable accident classification system; it provided a methodology for determining quantitative risks for those events for which a sufficient data base exists;
- (3) WASH-1400 currently provides the most complete picture of the probabilities of nuclear reactor accidents. Together with a sufficient data base, the event tree/fault tree procedure is the best available tool for the quantification of these probabilities;
- (4) WASH-1400 pointed up the importance in the reactor safety debate of accident effects other than early, or acute, effects.

Statement of Objectives

Following publication of the American "Reactor Safety Study," it was asked to what extent its results could be transferred directly to German conditions. Although the United States and the FRG use predominantly the same type of reactor for commercial power generation -- the light-water reactor -- there are a number of points which prevent a direct transference of the American results to German conditions. There are two main points to be mentioned in this regard:

The construction technology of the reference installations studied in the American report differs on numerous points from that of German installations. This applies in particular to the design and function of some important safety systems;

Siting conditions that exist in the FRG also differ from those on which the American study is based. For instance, the average population density in the FRG is about 10 times greater than in the United States. Even in the immediate vicinity of nuclear power plants in the FRG the average population density is about 3 times greater than in the areas surrounding American reactor sites.

It was therefore deemed necessary to conduct our own investigations if we were to be able to assess special German conditions involving differences in technological construction concepts and siting factors.

The minister for research and technology commissioned his own German study in the spring of 1976. The order was conceived in conjunction with and as part of the wide-ranging German reactor safety research program. The objective was not to incorporate the risk analysis directly into the nuclear licensing procedure but to discover new and improve the old assessment procedures, to take soundings on the present limitations of existing data bases and procedures relating to probability and to examine the setting of priorities within reactor safety research. The narrower goals of the investigations were (1) to determine the social risk relating to accidents in nuclear power plants and (2) to use the results to make comparisons with the American "Reactor Safety Study" for purposes of assessing differences in installation construction technology and siting conditions.

The studies on construction technology were done with the aid of a typical operating nuclear power plant of the 1300-megawatt class with a pressurised water reactor. Also taken into consideration were all sites in the FRG where nuclear power plants with light-water reactors and an electric power output of at least 600 megawatts were either in operation, under construction or going through the licensing procedure as of 1 July 1977. This meant that 19 sites or nuclear power plants with a total of 25 reactor blocks had to be considered.

In line with the broad requirements, the German risk study was broken down into two phases (phases A and B). Phase A largely adopted the basic assumptions and methods of the American "Reactor Safety Study." Phase B, which is chiefly designed for in-depth treatment of individual problems, was supposed to take greater account of advances in methods and the status of safety research.

The Reactor Safety Society was commissioned to do the German risk study. Its manager, Prof Dr A. Birkhofer, was responsible for the scientific direction of all work performed. The appendix lists the institutions which contributed to the study.

Research Methods

3.1 Description of Accident

In order to determine risks, models had to be developed for the processes that take place inside and outside the installation during an accident. The emphasis was on those events which would lead to sizable releases of radioactivity from the installation and thus to possible damage to surrounding areas.

First a determination was made of the location and amount of radioactive materials in the installation. Combined in the reactor core is an average of 95 percent of the total radioactivity inventory. The average remainder of 5 percent of the total inventory is found primarily in the spent fuel elements of the storage basin and to a lesser extent in the ancillary systems, particularly the off-gas system and the waste water system. Considering the safety measures that have been taken, no substantial contribution to risk is to be expected through a failure of these parts of the installation. Consequently, the investigations concentrated on possible releases from the reactor core.

The radioactive materials generated in the reactor core of an intact installation are surrounded by several structures. In addition to the "inner structures" (the lattice arrangement of the fuel and the fuel rod cladding), there are the "outer structures" (reactor cooling system and containment vessel). In the event of failure of the reactor cooling system or of the containment vessel, releases of radioactivity remain at low levels as long as the fuel rod cladding and the lattice arrangement of the fuel can essentially be kept intact. Consequently, the main emphasis is on studying those events which lead to failure of the inner structures. Subsequently, the possible consequences to the outer structures are studied.

The majority of the radioactive materials can be released only if the fuel becomes overheated, and particularly if the fuel lattice collapses -- in other words, if the fuel melts. Nevertheless, even with a total meltdown of the fuel, depending on the physical and chemical properties of the various radioactive materials, varying proportions of these materials would be left in the fuel melt.

In determining risk, those very events were studied which lead to a core meltdown. In line with an upper-limit assessment of the risk, this study proceeds on the assumption that the fuel will always melt completely whenever the core is insufficiently cooled.

When the fuel melts, the core support structures also fail. The molten fuel rods fall down into the lower hemispherical part of the reactor's pressure vessel along with the similarly melted structural materials. The decay heat released in the core melt is sufficient to melt through the reactor pressure vessel and possibly the underlying cement structures as well.

The energy from the reactor core and from the core melt gets into the atmosphere of the containment vessel through various processes, some of which take place simultaneously; there it produces a rise in pressure and temperature. Four important factors here are (1) the conversion to steam of the water left in the reactor pressure vessel; (2) the reaction of metal and water that takes place between the fuel rod cladding and the water or steam; (3) the production of steam when the melted core comes in contact with the sump water; (4) the conversion to steam of the water released when the concrete melts.

An important factor for the effects on surrounding areas is whether and at what point the pressure (or the temperature) in the containment vessel rises so high that the steel shell gives way. Although the radioactivity content in the atmosphere of the containment vessel is reduced in the course of time through condensation and sedimentation processes as well as through radioactive decay, particularly of the short-lived radionuclides, at the same time the overpressurization of the containment vessel can cause the steam and gas mixture and radioactive materials to flow into the primary piping system and thence to the outside if there are leaks in the containment vessel.

The radioactivity plume formed by the released mixture of steams, gases and aerosols is transported away from the installation by the wind. Moreover, the energy transported along with it can create a thermal draft. The at first relatively tightly concentrated exhaust plume is also spread by turbulent diffusion in a path at right angles to the direction of the wind. Consequently, with increasing distance the cloud covers a broader area. The simultaneous attenuation of the cloud as well as the sedimentation and possible elutriation of radioactive materials lower the concentration of radioactivity in the cloud. At the same time, the area over which the cloud passes becomes radioactively contaminated.

Human beings who are in this area can be exposed to radiation through direct irradiation and through inhalation of radioactive materials from the cloud and from sedimentation; exposure is also possible by taking in radioactive substances along with food. The level of the radiation burden, the number of persons affected and thus the possible harmful consequences of various kinds depend not only upon expected radioactivity concentrations but also upon the effectiveness of and ability to implement emergency protective measures.

Research Results

4.1 Construction Technology Analyses

A release of radioactive materials from the reactor core is possible only if the fuel rods become overheated in the course of the accident. There are two kinds of accidents which can cause the necessary imbalance between heat generation and heat removal: (1) loss-of-coolant accidents; and (2) transients. This historical differentiation terms as transients any even

temporary instances wherein power, pressure, temperature and the like might go out of control, so long as the event is not caused by leaks or ruptures. Coolant blockages can be ruled out as an appreciable contribution to the overall risk resulting from an overheating of the reactor core.

In accordance with the events selected and concentration on the classes of effects that are interesting with regard to core meltings, the results obtained have been compiled in Table 1. Accordingly, the total frequency of core meltdowns is 9×10^{-5} per year, or about once in 10,000 years. Small leaks in the principal coolant system and emergency power supply failures are the greatest contributing factors to overall risk. The first factor is essentially a question of the nonavailability of system functions and the second of the relatively high probability of incidence of the accident cause.

Figure 4 provides a picture of the contributions of various kinds of faults to the frequency of core meltdowns according to independent faults, common-mode faults, human error and various combinations of sets of these causes. In the event of large and medium-sized leaks in a principal coolant system, the safety systems needed for accident control go into operation automatically. Consequently, human error plays only a subordinate role in these accidents. Common-mode faults are important here in connection with the breakdown of recooling pumps during the long-delay phase. By far the greatest contributing factor in the case of small leaks is the faulty manual measures taken by plant personnel to shut down the installation.

Results like these simultaneously constitute starting points for conscious improvements in installations. This has already been made obvious by the fact that interim results were reported during the 3-year term of the research. There has been a systematic reduction of identified consequential risk factors deriving from individual weak spots, particularly in the link between control technology and procedural technology. Corresponding changes in installations were taken into account up to and into 1978.

In terms of the frequency of radioactive releases, it is necessary to consider in addition to the frequency of core melts the possibilities and attendant probabilities of containment vessel failure: leakage, failures from overpressurization and destruction caused by the explosion of steam. The probabilities depend upon the particular events; thus, the greatest frequency of core melting does not necessarily coincide with the greatest frequency of releases. All the events studied were placed in one of eight release categories according to their release characteristics. Assigned to each release category is a representative release which is derived from the most unfavorable values for the released proportions of the various radionuclide groups of the particular events studied.

The containment vessel performs an important safety function for the nuclear power plant, since in the case of most events it makes it possible to implement effective emergency protection measures by confining radioactive

materials for lengthy periods. It fails if pipeline and cable ducts are not sealed, if leaks occur as a result of defects in material or manufacture or if the strains placed upon it exceed failure limits. In this case the time and nature of the failure are crucially important. In the case of loss-of-coolant accidents, the hypothetical limits of the containment vessel are not exceeded. In core-melt accidents, failure from overpressurization is not to be expected in the initial phase of up to about 1 day. Premature failure is conceivable only as a consequence of a steam explosion or in the event of a leak in the containment vessel. The German risk study took into account leaks measuring between 25 and 300mm in diameter in its analyses of events.

If the core melt reaches the reactor sump, the resulting conversion to steam of the water collected there causes a pressure buildup over a long period, ultimately leading to an overpressurization failure of the containment vessel. Leaks in the vessel delay the time of failure according to the size of the leak; a large leak precludes failure from overpressurization. A massive combustion of the hydrogen formed during the core melt results in a short-term increase in pressure which does not exceed the failure limit of the containment vessel. The containment function of the vessel ensures that only in 0.7 percent of all core-melt accidents can acute effects be detected in the surrounding areas.

Determination of Accident Consequences

After the initial use of calculated radioactivity concentrations in the air and soil contaminations to determine potential doses for use as guidelines in establishing various protective measures and countermeasures, expected doses were determined with reference to these measures.

Taking actual population distributions into account for the 19 sites studied, collective effects were ascertained, with corresponding risk factor valuations for multi-block installations. Although this method made allowances for abnormal population distributions, it did not permit local evaluations because of the range of all other parameters. The available data material contained population figures according to sectors and radii for distances up to 80 km. For distances of more than 80 km and less than 540 km, a population density characteristic of Central Europe -- 250 inhabitants per square kilometer -- was taken as a basis, since within this range local or regional differences no longer have an effect on research results. Finally, beyond this circle and up to a distance of 2,000 km an average population density figure of 25 inhabitants per square kilometer was used. The radius that takes in Europe includes numerous thinly populated areas and large bodies of water, at distances of up to 80 km. For distances of more than 80 km and less than 540 km, which essentially covers Central Europe, a characteristic population density figure of 250 inhabitants per square kilometer was used, since within this range local or regional differences no longer have an effect on these research results. Beyond this circle and up to a distance of 2,500 km an average population density figure of

25 inhabitants per square kilometer was assumed, a figure conditioned by numerous thinly populated areas and bodies of water.

The dosage/effect relationship for acute somatic effects takes into account the fact that there are groups in the population which are more sensitive than others to radiation -- for instance, because of chronic infections, stomach and intestinal disorders, injuries, burns, operations and pregnancy. For these groups, which can amount to 10 percent of the total population, an average lethal radiation dosage of 340 rads was taken as a basis. On the other hand, the medical profession has made such advances -- for instance, in the treatment of leukemia and other malignant diseases with highly effective cytostatic drugs -- that most people's lives can be saved even after radiation exposures ranging between 200 and 500 rads. The dosage/effect relationship that takes both aspects into account begins at a dose threshold of 100 rads, shows a 50-percent mortality rate at 510 rads and attains a 99-percent mortality rate at 770 rads.

Figure 6 shows the complementary frequency distributions for acute effects for 25 installations, which is to say the rate of incidence for a collective effect that is greater than or equal to the effect shown by the curve. The curve is illustrated by the numerical examples given in Table 3.

Table 3. Incidence Rate of Acute Effects

Frequency Per Year		Acute Effects (fatalities)
1 in	100,000	2
1 in	1,000,000	200
1 in	10,000,000	1,400
1 in	100,000,000	4,400
1 in	1,000,000,000	11,000

The diagram shows all derived results up to the maximum collective effect (14,500 fatalities), the incidence rate of which lies at 5×10^{-10} per year. Even lower rates of incidence do not lead to larger-scale effects. It must be noted here that the maximum effect occurs only once in more than 100,000 cases observed. The average collective effect in the same release category is about 9 fatalities, with 95 percent of all cases being even lower.

A direct comparison with the acute effects ascertained in the American "Reactor Safety Study" is not possible because the study did not include cases with an incidence rate below 10^{-7} per year in the 100 installations studied.

It can be said in general that large-scale acute effects occur if there are large releases of radioactivity at locations with high population density,

if the wind is blowing toward the most unfavorable sector and if rain in the after-sector causes a high level of soil contamination.

Analogous to the acute effects, the maximum effect (around 104,000 fatalities) obtained in the computer runs has an incidence rate of 5×10^{-10} per year. Here as well, even lower rates of incidence do not lead to larger-scale effects.

The large number of delayed, or latent, effects results among other things from taking into account a large number of people with small and minimum amounts of radiation exposure. Around 80 percent of all the individual doses recorded are below 5 rems, which approximately corresponds to the dosage by age based on natural exposure to radiation. The latent effects would be distributed over a period of 30 years. In addition, about half of these would be caused in areas outside the FRG. On the other hand, the German population would also be exposed to comparable risks from foreign nuclear power plants.

The computer model always shows large-scale latent effects whenever large releases of radioactivity and favorable weather conditions in areas of comparable size cause soil contamination levels which are below the reference values for protective measures and countermeasures.

Since to date it has not been possible to establish genetic radiation effects in irradiated population groups, only animal experiments with the same degree of reliability as for delayed somatic effects can be used to assess this risk. The spectrum of possible health problems can range from minor anomalies to serious illnesses. It is for this reason that a sufficiently reliable categorization for purposes of comparison is not yet possible, even if limited to clinical relevance. Therefore, as in similar situations, only the genetically significant collective dosage was given, one which can be interpreted in accordance with the increasing level of knowledge.

Table 4. Incidence Rate of Latent Effects

Frequency Per Year		Latent Somatic Effects (fatalities)
1 in	1,000	2,700
1 in	10,000	3,900
1 in	100,000	94,000
1 in	1,000,000	65,000
1 in	10,000,000	74,000
1 in	100,000,000	83,000
1 in	1,000,000,000	94,000

The complementary frequency distributions for the genetic burden show a curve that is basically similar to that for latent effects. Consequently, the relationship between probability of occurrence and collective effects is similar. In the computer runs that were done, the maximum effect amounted to 420,000,000 man-years, with an incidence rate analogous to the acute-effect rate of 5×10^{-10} per year.

A study was also made of the areas and numbers of people affected under the emergency protection countermeasures of evacuation, rapid resettlement and resettlement.

According to previous stipulations, it was assumed that the immediate vicinity (Area A) of an installation is to be evacuated in the event of any accident. This predetermined area takes in 33 square kilometers and has a maximum of 66,000 people, with a mean of 6,900.

Areas B 1 and B 2, which call for rapid resettlement designed to lessen acute effects, are found in only three release categories. The areas affected can be a maximum of 379 square kilometers, with a mean of 20; more than 80 percent of all cases fall below the mean. The number of persons affected can amount to a maximum of about 1,000,000, with a mean of around 5,200; here again, more than 80 percent of all cases fall below the mean. In general, a rapid resettlement was found to be necessary in only 1 percent of all releases of radioactivity preceded by core melts.

The more remote Area C, which calls for a resettlement designed to lessen latent effects, is found in almost all release categories. The areas affected can amount to a maximum of around 5,700 square kilometers, with a mean of 680. Somewhat less than 70 percent of all cases fall below the mean. The number of persons affected can amount to a maximum of around 2,900,000, with a mean of 180,000. In this instance as well, more than 70 percent of all cases fall below the mean value.

The large number of people is found almost exclusively in the case of weather conditions characterized by rainfall. A prerequisite is a high population density. In general, a resettlement was found to be necessary for only 9 percent of all releases of radioactivity preceded by a core melt.

5. Comparison of Risks

Comparisons of accident-related risks from nuclear power plants with other natural and man-caused risks are problematic for several reasons. The two most important reasons are: (1) The injurious effects of various types of accidents are not the same. For instance, if only the acute effects are selected, this constitutes an arbitrary limitation of the material for comparison (latent effects could have more serious consequences than acute fatalities, for example); (2) The risk comparisons concern on the one hand risks for which empirical material is available (on transportation systems,

for example) and on the other risks that have been ascertained by analytical means (nuclear power plants). Empirical material, however, does not take into account the up-to-date status of a technical facility, and analytical material is subject to limited validity because of the incompleteness of calculations and the limiting marginal conditions.

Comparative risk analyses in different branches of industry -- for various energy generation installations, for instance -- have thus far been undertaken only on an experimental basis. Large-scale chemical operations, which like nuclear technology represent a serious potential hazard, similarly offer only a few studies upon which to draw. The only one to be mentioned in this regard is the British "Canvey Island Study," which, with higher rates of incidence, showed a definitely comparable scale for acute fatalities. As is the case with nuclear technology, additional safety measures can reduce the frequency but not the scope of harmful effects.

The German risk study did not go into such overlapping risk analyses, although their justification and value must certainly be acknowledged, with consideration for all marginal conditions. However, a direct comparison can be made -- and this was done here -- of expectation values for latent somatic effects (fatalities from leukemia and cancer) caused by accident-related releases of radioactivity for 25 installations and for leukemia and cancer fatalities occurring spontaneously in the same population. The corresponding numerical values (approximately 10 accident-related fatalities per year to 1,890,000 spontaneous fatalities per year) differ by several powers of 10. A favorable ratio is the result even when exposure to natural radioactivity is brought in, taking as a basis the dosage/risk relationship used in the study (around 10 computed accident-related fatalities per year to 84,000 computed fatalities from exposure to natural radiation). The same situation is also depicted in Figure 9, which compares the expectation values for accident-related individual effects (acute and latent effects) with the expectation values for spontaneous fatalities from leukemia and cancer. Exhibiting a similar pattern are the expectation values of genetically significant radiation burdens on the basis of accident-related releases of radioactivity for 25 installations and of natural radiation exposure (64,000 man-rems per year to 67,000,000 man-rems per year).

Comparison with WASH-1400

One of the results of the German risk study is that the findings are similar to those of the American "Reactor Safety Study" despite the differences in construction technology and siting conditions, while taking into account deviations from the American methodology. This is true of acute effects (acute fatalities) as well as of latent somatic effects (fatalities from leukemia and cancer). Figure 10 shows the comparison for acute effects, Figure 11 the corresponding comparison for latent effects. The ranges of the German and American curves largely coincide, but the German numerical values for latent effects are generally higher than the American results.

This can be traced chiefly to the pessimistic dosage/risk relationship and the higher average population density.

A totally analogous procedure on all points to the approach taken in the American "Reactor Safety Study" was not possible in the German investigations. Essential deviations concern the following points:

The differences in construction technology between American and German nuclear power plants led to different research priorities, chiefly for the reliability studies. For instance, initial interim results from the event-tree and fault-tree analyses revealed that more detailed studies than originally planned were needed for an assessment of the risks from transients;

The accident-consequences model used for the German risk study corresponded in its principal features to that of the American study. Nevertheless, it was necessary to adapt various individual features of the model to German siting conditions. In particular, a German model was developed for protective measures and countermeasures, one which takes into account the general governmental recommendations for disaster protection in effect in the FRG.

There has been increasing discussion in recent years of the methods and objectives of risk studies. Resulting from the discussion on the American "Reactor Safety Study" in particular were several suggestions important to the German study as well. For example, one deviation from the American report was that a German dosage/effect relationship was derived on the basis of new findings for the purpose of determining acute effects; and for an assessment of latent effects, a purely proportional dosage/risk relationship related to dose rate was used with the risk factors listed by the International Commission on Radiological Protection (ICRP 26). While use of the German dosage/effect relationship compared to the American produces no significant differences with acute effects, use of the American dosage/risk relationship instead of the German would considerably reduce the number of latent effects -- for instance, it would reduce the maximum effect by about half.

A serious accident occurred in March 1979 at the American Three-Mile Island Nuclear Power Plant, Block 2, near Harrisburg, Pennsylvania. Thereupon the German risk study was reviewed to determine whether it covered the events that had taken place. This was found to be the case, since a loss of the in-house electric power supply leads to a greater strain on the system than -- as occurred at Three-Mile Island -- the failure of the feed-water supply. Thus, the power supply failure represents the enveloping factor, so to speak, for the Three-Mile Island case. The problem of a leak in the pressure container, which also occurred at Three-Mile Island (caused by leaving the blowout valve open by mistake), had already been discussed earlier on the occasion of the first CRS /Reactor Safety Society/ technical conference on "Nuclear Energy and Risk" on 3 and 4 November 1977 in Munich; this discussion led to system changes in the German nuclear power plants.

Evaluation of Results

Risk analyses have only limited validity given the present level of knowledge. This is also true of the results of the German risk study, and an evaluation of this study must take these fundamental limitations into account as well as the marginal conditions on its mission. The emphasis of the investigations was on determining the risk to society. Only a derived individual risk can be drawn from this, one which cannot be attributed to any specific location.

The results obtained are in the nature of a model. This becomes especially obvious in the investigation of events linked with releases of radioactivity. Employed here were models used to depict core melts, the release and dispersion of radioactivity as well as the biological effects of radiation. Gaps in detailed information were filled with simplifying and pessimistic assumptions -- that is, with assumptions that cover the most unfavorable occurrence. Adding to the uncertainties of analyzing construction technology is a partially quantified range of the calculated accident consequences.

It was not the task of the study to examine every possible influence which contributor to the risk involved in nuclear power plants. Thus, the study merely ascertained the risk resulting from accidents, not the risk linked with the prescribed operation of nuclear power plants. Risk factors deriving from such potential influences as war, terrorism and sabotage were not examined.

7458
CSO: 5100

FINLAND

BRIEFS

NUCLEAR POWERPLANT TURBINE FAILURE--The Olkiluoto-1 nuclear powerplant of Teollisuuden Voima was disconnected today from the national grid owing to sudden failure of a turbine. The reason for the failure is presently being investigated. The disturbance has caused no radioactive leak. [Text]
[LD311800 Helsinki Domestic Service in Finnish 1530 GMT 31 Oct 79 LD]

CSO: 5100

CONFIDENCE IN NUCLEAR POWER'S SAFETY SEEN SHAKEN

Paris LE FIGARO MAGAZINE in French 13 Oct 79 p 84

[Editorial by Alain Griotteray: "Cracking Confidence"]

[Text] The hesitant behavior of EDF [French Electric Company] in the incident of cracks in two of the Gravelines and Tricastin reactors casts the first shadow of doubt on the heretofore assured progress of the French nuclear program.

The historian would say that French post-war policy has rested upon the development of civil nuclear energy.

Even the ordinance of 1945, creating the AEC, implied that our country intended to resume its original policy of scientific research. While the only preoccupation at the time was military and the Pierrelatte and Marcoule reactors were built in connection with the bomb, in 1955 "a massive program" was established "to develop civil powerplants" for electrical production.

This year, the French are consuming as much electrical power in one month as we did the entire year of 1949. We owe much to the foresight of those who launched the Chinon operations around 1955. But this determined action was already exposed to the same adversaries and competition. At first, military reasons prompted the United States to oppose French disposal of the nuclear weapon, indispensable to its defense. It is strange that the men of the Fourth Republic, so submissive towards the Americans, had the courage, despite their sarcasm, to establish a policy which would take off after 1958 with the impetus from General de Gaulle. That is the decade during which France would struggle like Seguin's goat until early 1969 to preserve its autonomy. At the very beginning, France perfected the natural uranium-graphite-gas chain because the United States refused to supply us.

Through all the upheavals of these difficult years, from the Suez crisis to the relinquishment of Algeria and the euphoria of discovering Saharan petroleum, the French desire for energy independence continued to grow stronger.

The budgetary and economic difficulties consequent to May 1968 slowed the momentum; perhaps General de Gaulle's departure dampened the enthusiasm. In any case, in November 1969, shortly after the dedication of the Saint-Laurent-des-Eaux powerplant, President Pompidou announced that, from then on, EDF would build American-style powerplants. Despite opposition from a large percentage of polls and researchers, France gave in. This decision was made because of the output and excessively high electrical consumption of the French process. Already dependent for its petroleum, France risked becoming dependent upon the Americans for its enriched uranium. Its policy would be subject to the whims of Congress or of a president like Carter, for example. Tirelessly, France took the initiative to urge Europe to research means of manufacturing enriched uranium. Along with Italy, Belgium, and Spain, EURODIF [European Diffusion Agency] was created and the Tricastin construction was begun. Raymond Barre just dedicated the first part of the work.

Thanks to Tricastin, which will produce 30 percent of the enriched uranium in the free world, about 100 power plants in Europe will be supplied in 1982-1983. Our national rate of dependence will then fall to [number illegible] percent.

Thus, after starting with a considerable handicap, France was reached second place in civil nuclear strength and will allow Europe to attain autonomy in a short time. Where researchers the world over have not yet succeeded in finding the process for avoiding the diversion to military purposes, France can indulge in the luxury of perfecting a third uranium enrichment process chemically which the Americans are about to purchase.

This little-known French discovery--its success depends upon its secrecy--should insure the advancement of a large sector of our economy. Thus, while West Germany, so often cited as a model of efficiency, has been bogged down for 3 years in political disputes over its efforts, France has resisted all attacks from the five columns, whose plans are so easily guessed. Like others in other times, the anti-nuclear Europeans are the toys of those, easy to flush out, who do not want an independent Europe. As if by chance, all of these movements which succeeded in blocking half the paths by judicial procedures, and which overturned Swedish policy and postponed the nuclear resources in Norway, have the same origin, the same methods, and apparently limitless means.

No doubt our country, shown to be the most mature, will be the stage for immense antinuclear maneuvers in the months to come. The dispute surrounding the arrival this week of the pacifist Fischer, headed for the Hague plant, is a new sign of this. French opinion, so often criticized for its fragile sensitivity, has remained impermeable to these manipulations up to now and has permitted the blossoming of a 30-year policy of independence by means of peaceful nuclear power. The public powers need to keep the confidence of the French and avoid ruining such a start.

9171

CSO: 5100

NUCLEAR POWERPLANT CRACKS TAKE POLITICAL TURN

Paris LE POINT in French 8 Oct 79 p 74

[Article by Alain Dauvergne: "A risky compromise"]

[Text] The matter of cracks in the nuclear powerplants is embarrassing for the EDF: discussion is now no longer confined to economics and technology, it has also become political.

Below, the North Sea is lost beneath a low and gray sky. In the foreground stands a beige and red building, 400 meters long and as high as the Arc de Triomphe—the nuclear powerplant of Gravelines. Thursday afternoon some 3000 people were quietly at work at the gigantic site. Had the business of the cracks (see LE POINT NO 367) been buried? Quite the contrary—even EDF's desire for pacification, demonstrated that same Thursday evening—will not prevent the controversy's further development. But from now on it will be developed in Paris at the headquarters of the EDF; in the corridors of the National Assembly; in the shade of ministerial offices. The discussion is not just technical; it also involves economics and politics.

To start with, the revelations by engineers of the CFDT last 21 September will be remembered: some essential components of the 900 megawatt nuclear powerplants, the new generation of French pressurized water reactors, have shown cracks. But several reactors of that type were to be charged (with nuclear fuel) in a matter of days at Gravelines and, particularly, at Tricastin." Look out! there is danger" the CFDT, and immediately afterwards the CGT, cried out and concluded by calling for a halt before irreparable damage was done.

The technical discussion was started. For the minister of industry those 7mm cracks presented no immediate risk at all: "They would have to be ten times greater to give cause for a serious alert" said the experts "and according to our measurements that won't happen for another 5 to 6 years— at worst." The minister, Andre Giraud, then gave the EDF permission to go ahead; the reactors at Gravelines and Tricastin 1 can be charged with (enriched uranium) fuel and

started up, to be definitely connected to the national power grid 2 1/2 or 3 months later.

The operation was announced for Tuesday evening at Gravelines and for the second day after that at Tricastin. It will not take place, however, since the unions will oppose it. What they are asking for, at the very least, are more complete verifications for two reasons: first because the most serious cracks were found at the powerplants that are still in the process of being fabricated at the factory and not on those that are to be put into service today. No one can say whether there are not even more serious cracks on these. It is impossible to monitor the development of these cracks effectively unless they are carefully identified before the reactors are put into service. The development of the cracks possibly spell out an eventually dangerous situation.

To avoid a test of power with the labor unions—and on the eve of a demonstration at Tricastin organized by some 40 movements and associations—the EDF prepared a strategic retreat and, on Thursday evening, decided to take some new steps. The charging of the powerplants with fuel would be postponed by 1 to 3 weeks. Did that satisfy the unions? Nothing is less certain. At any rate they did not get all they asked for, particularly not the repair of the "risky" cracks before the reactors are put into service. That would take about a year, which is too much.

It is not at all certain that the calculations of the EDF are correct, however. The putting into service of the reactors without the repairs represents an optimistic hypothesis. It is hoped, at the Ministry of Industry and by the EDF, that a robot capable of repairing the cracks in automated fashion (no human workers could be sent into an irradiated environment) will be introduced at the end of 1981. That would be long before any real danger is to be feared. But that is not sure at all, as a high official recognizes: "Repairs will be made or the powerplants will have to be shut down." According to an expert, that clearly signifies that by not repairing the cracks immediately the risk is being taken of having to shut down a dozen reactors in 5 to 6 years from now. That would amount to the equivalent of all the power now being produced per year as hydroelectric power. Even if there is no immediate danger in putting the reactors with cracks into service, which could very well be true, ought one to take that risk? That question may be raised during the hearing set for Thursday, in which Andre Giraud will appear before the committee on power generation of the National Assembly, chaired by UDF deputy Michel Durafour.

Now politics have entered into the fray. After the serious pronouncement by Simone Veil and by the Electronuclear Information Council, the socialists are asking for the formation of a parliamentary commission of inquiry. The communists, although defenders of nuclear

power, ask for a hearing to which managers of the EDF and involved unions will be invited to get a better definition of the danger incurred. The sense of something being wrong is troubling.

Those who head the nuclear industry are more accustomed to being secretive than to providing information. In one fell swoop they have introduced dangerous cracks into the confidence of Frenchmen instead of reassuring them. Those are the cracks that call for the most urgent repairs.

9291

CS0: 5100

FRANCE

TRICASTINE, GRAVELINE NUCLEAR POWERPLANT DECISION MADE

Paris L'USINE NOUVELLE in French 11 Oct 79 p 100

[Article by Bertrand le Balc'h]

[Text] --Will the French electronuclear program be delayed by several months? This is today the main question of the industrial world in connection with the fissured nuclear power stations. Let us recall the facts.

On September 21, the CGT [French Labor Confederation] and the CFDT [French Democratic Confederation of Labor] revealed the existence of fissures on two essential organs of the 900 megawatt PWR nuclear power stations, specifically, the tubular plate of the steam generator and the pipelines of the reactor tank. The agitation caused by this news was even more alarming when it was learned that these defects had been discovered in the plant 12 months ago as regards the tubular plates, and last spring for the pipelines. However, neither the builder, Framatome, nor EDF [French Electric Company], nor the Ministry of Industry, informed public opinion. As for the Information Council on Electronuclear Energy, established precisely by the authorities for the purpose of keeping the public informed, they came to know of the existence of these fissures from the press!

Three weeks after this revelation, what is the situation?

--These fissures do indeed exist. This was confirmed by Framatome, EDF and the Ministry of Industry. According to the communique issued by Framatome, these are fissures a few millimeters deep, located just below the stainless steel sheath deposited by welding on the tubular plates and pipelines.

--Discovered in the plant, these defects were revealed in two power stations ready for their enriched uranium charge: Tricastin 1 and Gravelines 1 (fissures on one pipeline out of three). In the case of Dampierre 1, the detection operations are in progress. They will be extended progressively to the 12 other tanks already installed on the nuclear sites (Tricastin, Gravelines, Dampierre, Saint-Laurent-des-Eaux, Le Blayaie). As far as the six power stations of the same

generation already operating (Fessenheim 1 and 2, Bugey 2, 3, 4 and 5) it will not be possible to inspect them before June, 1980, since the automatic detection devices capable of operating in irradiated medium are not yet ready.

--Measures have already been taken by Framatome to prevent these manufacture defects from ever happening again. And the manufactured vessels not yet delivered will be repaired in works.

On Site Repair Impossible

On October 1, the Ministry of Industry granted EdF the necessary approval for charging with enriched uranium the power stations of Tricastin 1 and Gravelines 1. The authorization was issued on the basis of the reports handed over by the experts of the permanent nuclear section, after several months of enquiry. On this occasion, Francois Kosciusko-Morizet, Director of the Section of Quality Control and Industrial Safety at the Ministry of Industry asserted that these fissures did not represent any hazard in the immediate future. "Even in extreme conditions of utilization, specifically, daily starting and shutdown of the reactor, no unfavorable effect may be expected for 5 or 6 years."

Nevertheless, the fact is that the loading of these two power stations, which EdF had announced would be done on 2 and 3 October, did not take place. As far as the CGT and CFDT unions were concerned, indeed there could be no question of allowing this operation to be carried out before the implementation of a complete diagnosis of the defective organs. The union officials affirm that: "We cannot be content with the sounding checks carried out by the EdF."

But suppose the check-up were to reveal the existence of other fissures, what would their attitude be? Would they demand repairs? If so, would EdF and Framatome be capable of carrying them out directly on the site? "Not for the moment", answered an EdF engineer. "To carry out repairs, we must be able to pre-heat, and then proceed to after-heating. That would be possible in the factory, but not on the site. Other methods are being developed, but it will take 6 months to perfect them. Then the actual work must be carried out. This gives the 9 month period mentioned for the hypothesis of repair."

Would this delay, affecting totally 6,900 megawatt units, and partially, several other units, be compatible with the objectives of the French electronuclear program? Certainly not. Now we can understand better why the Ministry of Industry and the EdF, supported by the assurances of the Safety Services, should have opted in favor of loading, in spite of the presence of fissures.

Assurances from the Safety Services

Nonetheless, this decision represents a double wager:

—First, a technical wager. The EdF management asserts, that the fissure detection devices to be used in irradiated medium will be ready by next spring and the automatic repair equipment by the end of 1981. What if for some unforeseen reason, these investigations were delayed, how can the fissures be checked?

—Secondly, an economic wager. It may be possible, that as they assure us, these power stations can operate for 5 years without particular hazards. But it would be very doubtful if the period were to extend to 10 or 15 years. In other words, might there not be the risk that power stations expected to operate for 30 years would have their life reduced to half?

It is hardly probable that Andre Giraud, minister of industry, will answer all these questions in his appearance this week at the National Assembly.

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FRANCE

RESEARCHERS, INDUSTRIES COLLABORATE ON NUCLEAR STUDIES

Paris LE MONDE in French 3 Oct 79 p 21

[Article by Claude Francillon: "Grenoble Nuclear Center, Model or Test Ground"]

[Text] Grenoble—Continuing the policy launched a year ago on the occasion of the new director, Mr Pierre Corbet taking up his post, the Grenoble Nuclear Research Center (CENG) is opening increasingly to the economic circles, while the effort is emphasized for the sector of small and medium size enterprises.

The establishment of few months back, of an experimentation and technology transfer unit, within the Grenoble Nuclear Research Center itself, should make it possible to transmit to industry new technologies, and to take into consideration the demands expressed by regional and national industry. Finally, on the basis of the knowledge of the external needs, this new structure would incite the operational units of CENG to market processes and apparatus which they had developed for their own needs.

These words, which express perfectly in the Grenoble context, the collaboration between university and industry (even if the latter is not always as close as one would imagine) may seem surprising on the part of an organization hitherto considered "inaccessible," especially to the PME (small and medium-size enterprises). The "current" now seems to flow very well, since the CENG has signed many contracts with them.

"It would not be impossible to believe that we can achieve technological breakthroughs in other sectors besides traditional industry: tourism, construction, distribution," stated Mr Pierre Corbet, who said, that the external revenue, as compared to the subsidy from the Atomic Energy Commission have risen from 16.7 percent in 1977 to 17.4 percent in 1978, and to 22.3 percent in 1979. They should reach 25 percent in 1980. But these external revenues in 1979 represent only 18 percent of the total CENG budget.

During a recent press conference, on the other hand, the director of the Grenoble Nuclear Research Center emphasized the need for setting up a rigid management system, then specifying that: "There is no reason why any researcher should not be as good at management than an industrialist, the researchers should realize that their work should be profitable to everybody."

The Grenoble "Cheese"

The officials of the CGT (General Confederation of Labor) who follow the current evolution of the CENG estimate, that this concern about the profitability incurs the risk of leading quickly to calling into question all fundamental research. "Are they trying to sell CENG to the highest bidder?" asked Mr Bernard Troulet, secretary of the CTG Departmental Union. "These interpenetrations between public and private sectors are alarming," he said, and in our opinion, Grenoble is a testing ground in this area." The CGT recalled that the recent collaboration agreements signed between the Societe pour l'etude et la fabrication de circuits integres speciaux (Company for the Design and Manufacture of Special Integrated Circuits) (a subsidiary involving a 50 percent participation each for the CEA [French Atomic Energy Commission] and Thomson-CSF), and the Motorola Group, one of the leading U.S. electronics companies, will involve a technology transfer to the company, which would not necessarily be favorable to the development of integrated circuits on the French level. Mr Troulet estimates that: "At present, all the large international industrial groups are installed around the Grenoble cheese, represented by the CENG, the National Scientific Research Center and the University," especially through the small enterprises established in the ZIRST (Area of Innovation and Scientific Technical Creations) of Meylan.

As for the director of the CENG, he asserts that the restoration of the center's "balance" will not take place at the expense of fundamental research. The latter still makes up 30 percent of its activities, devoted to a considerable extent, to the physics of the condensed state (solid state physics, metallurgy, magnetism, cryogenics), as well as studies related to the problem of controlled fusion.

As regards the nuclear sector, it still remains the main research area of the CENG: reactor safety, study of fuel behavior, the behavior of cooling systems; technological study of future reactors and new processes of isotope separation.

Specialized, finally, in the sectors of electronics, informatics and new energies (50 percent of French research in the field of solar energy is carried out in its laboratories), the Grenoble Nuclear Research Center remains the foremost provincial research center. Should the Grenoble tradition of development of scientific discoveries not permit it to be at the spearhead of the "innovation mission"?

UNITED KINGDOM

DAVID HOWELL COMMENTS ON NEED FOR NUCLEAR ENERGY, PLANNING

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[Article by Robert Hutchinson, PRESS ASSOCIATION energy correspondent]

[Excerpt] A "majority common sense view" in Britain wants to press ahead with expansion in nuclear power, Energy Secretary David Howell told me today. The risks of not launching such a program "in these terms of danger to our society, particularly to its weakest members," were enormous, he stressed. He added, however: "Those risks have got to be properly and openly balanced against the arguments of those people opposed to nuclear power. I shall seek, on behalf of the government, to put the facts as clearly as I can. I think the argument hitherto has been somewhat one-sided, and I want to see it being a two-sided argument."

Mr Howell warned that by the 1990s, Britain will be back to heavy dependence on oil imports, and increasingly coal must be used for petrol and synthetic natural gas. "So the question arises, how do we produce electricity?" he said. "A modern society needs to keep warm and comfortable and to power its factories. There can be only one answer--nuclear power."

The energy secretary emphasised no nuclear energy expansion could be contemplated without full safety clearance. Alternative energy resources--sun, tide, wave and wind--cost far more than nuclear energy.

Mr Howell believed there was a majority common sense view in favour of pressing ahead with an expanded nuclear power programme. There was proper, genuine, concern which must be fully reassured. But there was also "a very small" minority who were against development because, he said, they were against capitalism and the free way of life organised in Britain.

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